

MONOGENETIC TREMATODES OF GULF OF MEXICO
FISHES. PART VII

THE SUPERFAMILY DICLIDOPHOROIDEA Price, 1936

(Continued)¹

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This, the seventh paper of the present series treating the monogeneids of the Gulf of Mexico, deals with several species belonging to the genus *Mazocraeoides* Price, 1936 of the family Mazocraeidae Price, 1936. It continues presentation of the data concerning members of the suborder Polyopisthocotylea Odhner, 1912 obtained during a recently concluded study of these ectoparasites of fishes. The organization and purpose are the same as for preceding installments.

All measurements were made using the ocular micrometer and are cited in millimeters. In the cases of curved structures measurements are of lines subtending the greatest arcs of those structures. In the descriptions given below the mean is presented first, followed by the minima and maxima in parentheses. The number of measurements used to derive the mean is usually the same as the number of individuals measured; otherwise the actual number employed appears in parentheses before the measurements. All drawings were made with the aid of the camera lucida.

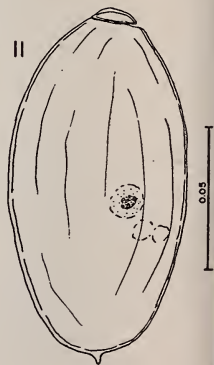
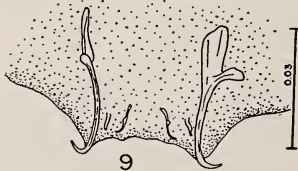
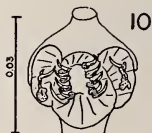
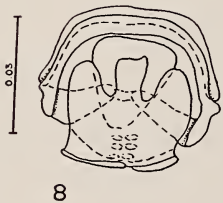
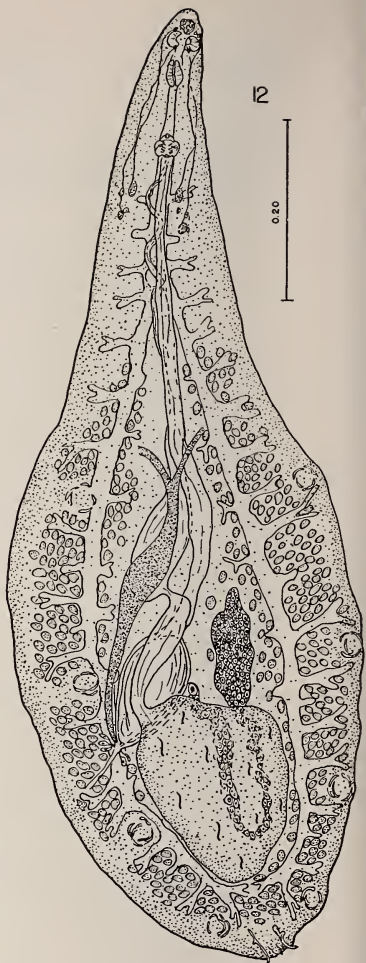
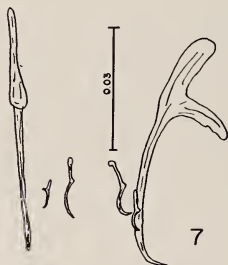
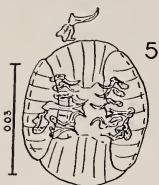
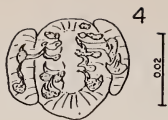
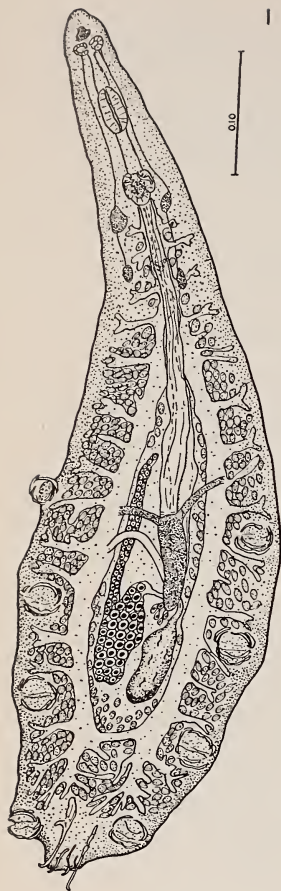
RESULTS

Suborder Polyopisthocotylea Odhner, 1912
Superfamily Diclidophoroidea Price, 1936
Family Mazocraeidae Price, 1936
Genus *Mazocraeoides* Price, 1936

In addition to the new species described herein, the genus *Mazocraeoides* contains *M. georgei* Price, 1936 and *M. dorosomatis* (Yamaguti, 1938) Sproston, 1946.

¹Contribution from the Biological Laboratories of the Citadel and the Oceanographic Institute of Florida State University, Tallahassee. Work aided by the Florida Academy of Science - A.A.A.S grant-in-aid for 1952.

Acknowledgments and dedication of the present installment are the same as for preceding ones.



The unusual, somewhat clavate body shape of its members is so characteristic that the genus is easily recognized. However, despite its aberrant shape, its affinities with other mazocraeid genera, e.g. genital atrium armament, clamp structure and anchors, are clear.

All of the hosts bearing the known members of this genus belong to the suborder Clupeodei. *M. georgei* and *M. opisthonema*, described below, are the most closely related and occur on gills of members of the family Clupeidae. *M. dorosoma*, the most different one, is parasitic on *Dorosoma thrissa* a member of the clupeoidid family Dorosomidae.

Two redescriptions of *M. georgei* Price, 1936 are given below. The first is of the worms taken from *Brevoortia patronus* from the Gulf of Mexico and the second is of the worms from several *Pomolobus* spp. from the Atlantic Ocean. This is done with the hope that future studies of the group will be facilitated. The reasons underlying this action are: (1) the hosts belong to two different genera and occur in different localities, (2) certain small but constant morphological differences exist between the flukes which because of a dearth of specimens cannot now be regarded as species significant. Later studies may reveal further differences of either sub-specific or specific value.

Explanation of Figures

Mazocraeoides georgei from *Brevoortia patronus*

1. Whole mount, ventral view.
2. Clamp, open.
3. Enlargement of posterior end showing anchors.
4. Genital corona.

Mazocraeoides georgei from *Pomolobus pseudoharengus*

5. Genital corona, with free spine.
6. Clamp, open.
7. Anchors.

Mazocraeoides opisthonema n. sp.

8. Clamp, closed, ventral view.
9. Enlargement of posterior end showing anchors.
10. Genital corona.
11. Egg.
12. Whole mount, ventral view. Composite drawing of the body outline of one specimen and internal organs of another.

MAZOCRAEOIDES GEORGEI Price, 1936

(Figures 1-4)

Host: *Brevoortia patronus* Goode, Gulf Menhaden, a nerito-pelagic marine clupeid.

Location: Gills.

Locality: Alligator Harbor, Florida.

Previously reported hosts and locality: *Pomolobus pseudo-harengus* and *P. mediocris* from Woods Hole, Mass.

Number studied: 9.

Number measured: 5.

Redescription: Body clavate, 1.1 (0.7-1.3) long by 0.4 (0.2-0.5) wide, rounded and not flattened dorso-ventrally as Linton (1940) stated, anterior portion of body long and tapered, posterior end broad and bluntly rounded; opisthaptor not separated from body. Cuticle thin, with delicate anterior striae. Prohaptor a pair of buccal suckers placed laterally in the buccal funnel; cephalic glands opening via ducts to the buccal funnel; posterior-lateral to genital atrium. Opisthaptor consisting of 4 pairs of clamps ventro-lateral in posterior half of body and slight posterior extension of body bearing 3 pairs of anchors. Clamp structure difficult to discern because most views obtained are of the open edges; however, clamps analysable on one specimen showed the following: anterior clamps slightly larger than posterior, (10) 0.037 (0.030-0.045) long by 0.031 (0.026-0.041) wide; ventral loop continuous, dorsal loop elements apparently incomplete though prominent, middle loop complete, center piece sculptured. Anchors postero-medial to posterior clamps; largest anchors lateral, 0.055 (0.047-0.061) long, with stout shafts (deep roots) and sickle-shaped ends; intermediate anchors smallest, similar to larval hooks in other form, 0.007 (0.007-0.009) long; medial anchors, 0.018 (0.014-0.022) long, roots modified giving entire anchor a more or less S-shape. Mouth subterminal. Pharynx ovoid, 0.042 (0.041-0.043) long by 0.030 (0.027-0.036) wide; esophagus broad, ramified posterior to genital atrium, extending to one-third level of body. Gut bifurcate, crura ramified, rami mostly lateral, confluent posterior to testis. Testis saccate, postequatorial, to left of midline between intestinal crura, 0.256 long by 0.054 wide; vas deferens wide, slightly sinuous, in midline. Genital pore midventral, located at about the middle of the esophagus, opening into an armed genital atrium. Genital corona in three pieces; central, ring-like muscular piece, 0.026 (0.023-0.030) long by 0.022 (0.020-0.023) wide, armed medially by 5 pairs of small, dorsally curved spines, 0.005 (0.004-0.007) long; 2 laterally placed curved muscular pieces, 0.018 (0.015-0.019) long by 0.008 (0.007-0.009) wide, armed by a pair of larger, ventrally curved spines, 0.009 (0.007-0.012) long, with irregular bases. Ovary tubular, folded, to right of midline; oviduct extending medially from median end of ovary lobe. (Ovaries and testes in these forms difficult to discern and somewhat variable in shape and extent.) Ootype dorsal to vitelline reservoir; uterus proceeding anteriorly in midline. Genito-intestinal canal apparently curving medially from the right crus. Vaginal pore irregular in outline, middorsal, at posterior end of what often appears to be a long antero-dorsal groove; vaginal duct and internal connections not observed. Mehlis' gland present.

Vitellaria follicular, near intestinal crura, mostly between rami, from a level posterior to genital pore to near posterior end of body; transverse vitelloglands fusing in midline to form Y-shaped vitelline reservoir. Egg not observed.

Discussion: A description of *Mazocraeoides georgei* Price, 1936 was first published in a brief preliminary account and later redescribed and figured by Linton (1940) from the gills of two species of *Pomolobus* from Woods Hole, Mass. The specimens on which the present redescription is based were taken from the gills of a host belonging to the genus *Brevoortia* of the family Clupeidae. This pattern of parasite infection may reflect the relationship of the hosts. As mentioned above it is possible that subspecific or even specific differences exist between these *Brevoortia* parasites and those from *Pomolobus*.

MAZOCRAEOIDES GEORGEI Price, 1936

(Figures 5-7)

Hosts: *Pomolobus pseudoharengus* (Wilson), Alewife and *P. mediocris* (Mitchill), Hickory Shad, from Woods Hole, Mass.

Number studied and measured: 3.

Additional description: Body 1.9 (1.5-2.2) long by 0.7 (0.5-0.9) wide. Anterior clamps larger, (6) 0.045 (0.036-0.049) long by 0.038 (0.034-0.043) wide. Three pairs of anchors; lateral pair largest, 0.063 (0.061-0.065) long; intermediate anchors smallest, 0.012 (0.008-0.018) long; medial anchors, 0.015 (0.009-0.019) long. Pharynx ovoid, 0.054 (0.053-0.054) long by 0.041 (0.038-0.046) wide. Genital corona with three muscular pieces. Center part a ring-like muscular piece, (2) 0.034 (0.034-0.035) long by (2) 0.026 (0.026-0.027) wide, armed medially by three pairs of small dorsally curved spines, 0.007 (0.007-0.008) long; two curved muscular pieces, 0.024 long by 0.008 wide, armed with a pair of large, ventrally curved spines, 0.012 (0.009-0.017) long, these spines apparently not terminally forked. Testis saccate, lying to left of body, 0.329 (0.243-0.425) long by 0.144 (0.121-0.182) wide. Eggs *in utero* appear somewhat variable in shape, generally fusiform, (1) 0.167 long by (1) 0.109 wide; some with filaments at both ends, others with none.

Discussion: This study was made from several specimens on Linton's USNM Helm. Coll. slide No. 35623, and is given because of the lack of detail in previous descriptions.

These forms differ from those on *Brevoortia patronus* (described herein) in the following respects: (1) spines on reniform muscular genital pieces not forked distally, (2) bases of these same spines smaller and of a different shape, (3) shape of the posteriormost spines on ring-like muscular genital piece, (4) host. These differences may later be shown to be either subspecific or specific in stature.

MAZOCRAEOIDES OPISTHONEMA n. sp.

(Figures 8-12)

Host: *Opisthonema oglinum* Gill, Theard Herring, a nerito-pelagic marine clupeid.

Location: Gills.

Locality: Tampa Bay, Pinellas Co., Florida.

Number studied and measured: 3.

Holotype: USNM Helm. Coll.

Description: Body elongate, clavate, 1.1 long by 0.4 (0.4-0.5) wide, narrowed anteriorly, broadly rounded posteriorly, opisthaptor not separated from rest of body. Cuticle apparently thin and smooth. Prohaptor a pair of buccal suckers placed laterally in the buccal funnel; cephalic glands postero-lateral to genital aperture with ducts leading to structures that are probably small head organs near the buccal suckers. Opisthaptor 4 pairs of clamps ventro-lateral on the broadened posterior part of body, anterior clamps slightly larger, (4) 0.025 (0.020-0.027) long by 0.024 (0.022-0.026) wide; ventral loop continuous, dorsal loop elements incomplete, middle loop complete, center piece highly modified, clamp framework apparently much like that of other mazocraeid flukes though no favorable views were available. Anchors subterminal, 3 pairs; lateral anchors largest, 0.038 (0.036-0.039) long, shafts stout, ends sickle-shaped, intermediate anchors smallest, very delicate, appearing very unlike ordinary anchors in shape, 0.007 (0.007-0.008) long, somewhat like the bottle-shaped sclerites found on other monogeneids; medial anchors slightly sigmoid, 0.011 (0.008-0.013) long, with long shafts and delicate sickle-shaped ends. Mouth subterminal. Pharynx piriform to ovoid, 0.041 (0.032-0.050) long by 0.019 (0.019-0.020) wide; esophagus elongate, laterally ramified, extending to anterior one-fourth level of body. Gut bifurcated, crura ramified medially and laterally, rami forked, crura apparently not confluent posteriorly. Genital organs somewhat variable in shape and location, often difficult to discern. Testes large, saccate, roughly ovoid, between intestinal crura postequatorially, 0.256 long by 0.094 wide; proximal end of vas deferens a large tube of irregular caliber, expanding dorsal to vitelline reservoir to form a seminal vesicle, narrowing and becoming somewhat sinuous anteriorly. Genital pore midventral midway the esophagus, opening into the armed genital atrium. Genital corona in 3 parts; center part a ring-like muscular piece, 0.021 (0.019-0.022) long by 0.020 (0.019-0.020) wide, armed medially by 4 separate pairs of small spines, 0.005 long, the posteriormost spine bearing a smaller spine on its base thus making 5 pairs of spines in all; two lateral curved muscular pieces, 0.017 (0.015-0.019) long by 0.007 (0.007-0.008) wide, armed with a pair of ventrally curved spines, 0.007 (0.007-0.008) long, with long irregularly shaped bases. Ovary elongate, folded, lying to left and dorsal to testis; oviduct running dextrally from right ovarian lobe. Ootype obliquely mesial and dorsal to the vitelline reservoir; uterus proceeding in midline to genital pore. Genito-intestinal canal running from right crus to posterior end of vitelline reservoir. Vaginal pore middorsal to gut bifurcation, ducts not observed. Mehlis' gland around base of ootype. Vitellaria follicular, near intestinal crura, from level posterior to gut bifurcation to near posterior end of body; transverse vitelloducts fusing in midline to form obliquely situated, Y-shaped vitelline reservoir. Egg *in utero* elliptical in outline, (1) 0.123 long by (1) 0.068 wide, no terminal filaments on one egg examined.

Discussion: A study of *M. georgei* Price, 1936 and *M. dorosomatis* (Yamaguti, 1938) Sproston, 1946, the other species in this genus, indicates

that the present species is different from both, being apparently more closely related to the former. It differs from *M. georgei* in the following characters: (1) position and shape of ovary and testis, (2) number and arrangement of genital spines, (3) extent of vitelline reservoir, (4) host. Further study of these forms must be conducted in order to ascertain their true relationship since they are morphologically very similar.

The hosts of the two American species, *M. georgei* and *M. opisthonema*, both belong to the family Clupeidae.

SUMMARY

This paper has presented a short discussion of the monogeneid genus *Mazocraeoides* Price, 1936 and its species. *Mazocraeoides georgei* Price, 1936 has been redescribed and discussed, and *Mazocraeoides opisthonema* n. sp. described.

Part VIII of this series continues presentation of the data on the superfamily Diclidophoroidea Price, 1936.

LITERATURE CITED

LINTON, EDWIN

1940. Trematodes from fishes mainly from the Woods Hole region Massachusetts. *Proc. U. S. Nat. Mus.* 88: 1-172.